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Limb lengthening by epiphyseal distraction of the femur in goats

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Epiphyseal distraction of the distal femur was accomplished in 10 goats (age 3–4.5 months). A modified Hoffman external fixation device was used as a unilateral frame. Paired 3 mm pins were placed in the epi- and diaphysis using a template. The distraction rate of 1–1.5 mm/day was continued for 6 weeks. Judged by the X-rays, epiphyseolysis occurred after 3 to 7 days of distraction. Three animals were sacrificed at 2 and 6 weeks, respectively, and four animals at 16 weeks from the end of the distraction period. The mean lengthening compared to the control side was 2.9 cm (18.6 per cent).

The following complications were observed: varus deformity (2), joint infection (2), articular disruption (2) and fracture after removal of the device (4). X-rays showed an intact growth plate after the lengthening procedure in eight of ten cases.

Femurs and tibiae from both sides of all animals were tested mechanically in torsion. Fracture occurred through the elongation area in just one femur. The remaining femurs fractured through the diaphysis.

The ultimate torsional strength of the elongated femur was 55 per cent compared to the control side. The tibia on the operated side was significantly less weakened compared to the control (mean 74.5 per cent; $P < 0.05$). A possible explanation for this observation may be an extreme stress protection of the femur caused by the continuous distraction.

It is concluded that leg lengthening by epiphyseal distraction in the femur is possible in animals, but

that the procedure is associated with major problems.

Guidelines for treatment of spondylolisthesis

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The incidence of spondylolisthesis in Norway is 3–5 per cent. Martina Hansens Hospital has developed a programme for treatment which has proved of considerable value. The following clinical classification is useful: 1) no symptoms, 2) moderate and intermittent back pain, and 3) severe symptoms (sciatica, neurological signs). The treatment in Group 1 is non-operative; surgery is considered in Groups 2 and 3.

Patients up to 25 years old without severe -olisthesis, kyphosis, tight hamstrings or positive Lasague sign are treated in bed with analgetics in the acute phase; thereafter stabilizing exercises, back school and a corset are used. Mobilization, manipulation and traction are contraindicated. Surgery is indicated if the -olisthesis progresses.

Patients aged 25–50 years old with severe back pain are operated on, as are older patients if they are also disabled by sciatica. Surgery includes decompression and/or fixation, depending on symptoms and age.

In patients up to 25 years without -olisthesis, we use Buck's operation, with moderate -olisthesis intertransversal fixation, with severe -olisthesis preoperative traction followed by intertransversal and/or anterior intercorporeal fixation using a retroperitoneal approach.

In older patients with moderate slipping, we use posterior intercorporeal fixation plus H-graft between the spinal processes. If the -olisthesis is marked, we do Gill's laminectomy and possibly intertransversal and/or anterior intercorporeal fixation.